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Addressing the Unique Challenges of Inner-City Practice: a Direct Observation Study of Inner-City, Rural, and Suburban Family Practices

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ABSTRACT *Previous research on geographic variations in health care contains limited information regarding inner-city medical practice compared with suburban and rural settings. Our main objective was to compare patient characteristics and the process of providing medical care among family practices in inner-city, suburban, and rural locations. A cross-sectional multimethod study was conducted emphasizing direct observation of outpatient visits by trained research nurses involving 4,454 consecutive patients presenting for outpatient care to 138 family physicians during 2 days of observation at 84 community family practices in northeast Ohio. Time use during office visits was assessed with the Davis Observation Code; satisfaction was measured with the Medical Outcomes Study nine-item Visit Rating Scale; delivery of preventive services was as recommended by the US Preventive Services Task Force; and patient-reported domains of primary care were assessed with the Components of Primary Care Instrument. Results show that inner-city patients had more chronic medical problems, more emotional problems, more problems evaluated per visit, higher rates of health habit counseling, and longer and more frequent office visits. Rural patients were older, more likely to be established with the same physician, and had higher rates of satisfaction and patient-reported physician knowledge of the patient. Suburban patients were younger, had fewer chronic medical problems, and took fewer medications chronically. Inner-city family physicians in northeast Ohio appear to see a more challenging patient population than their rural and suburban counterparts and have more complex outpatient office visits. These findings have implications for health system organization along with the reimbursement and recruitment of physicians in medically underserved inner-city areas.*

KEYWORDS *Inner City, Office Visit Characteristics, Patient Characteristics, Rural, Suburban.*

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INTRODUCTION

There is general agreement in the United States that a shortage of physicians exists in rural and inner-city areas.[1,2] Previous research based on geographic location has focused on differences between medical practice in rural versus nonrural areas.[2–10] These studies often use the term *urban* as a synonym for *nonrural*, thereby failing to distinguish inner-city from suburban areas.[3,4,6,8,9] In fact, inner-city and suburban locations may be distinctly different in terms of patient characteristics and health care delivery despite their geographic proximity.[11,12] Furthermore, previous research on geographic variations in medical practice has paid little attention to the primary care setting, in which Americans receive the majority of their medical care.[13]

Having worked in both an inner-city family practice and a suburban family practice, the lead author found striking contrasts in the patient populations and in the process of outpatient care based on practice location. As an example, inner-city patients seemed to have more medical and emotional problems. If these personal observations are generalizable to other practices and patients, the recognition of these differences might influence planning, recruitment, and retention of physicians in areas of medical shortage. Such information would aid clinicians, administrators, and policymakers as they strive to better meet the needs of patients in differing locations.

Consequently, we sought to compare the process of providing medical care among family practices in different geographic locations; we used a unique multimethod data set that characterizes office visits and practice features and provides local knowledge about rural, suburban, and urban distinctions.[14] We hypothesized that inner-city settings would see a population with greater medical and psychosocial problems, that rural settings would see an older and less-mobile patient population,[2,7] and that suburban settings would care for a younger patient population with less-complex needs. We further hypothesized that these differences in patient characteristics would be reflected in differences in the process of outpatient care that paralleled the differences in patient populations. We also explored geographic differences in patient satisfaction, preventive service delivery rates, and patient reports of their receipt of critical aspects of primary care.[15]

METHODS

Study Design and Data Collection

This analysis was part of the Direct Observation of Primary Care (DOPC) Study, a cross-sectional study of the content and context of outpatient visits to family physicians in northeast Ohio. The methods of the DOPC study have been described in detail previously.[14,16] Briefly, 531 family physician members of the Ohio Academy of Family Physicians practicing within a 50-mile radius of Cleveland and Youngstown, Ohio, were invited to participate in a study of the content of family practice. Physicians not practicing in family practice settings and physicians practicing in teaching practices were excluded, with the exception of physicians practicing in community sites that also serve as residency training practices for the Northeast Ohio University College of Medicine.

Participating physicians were visited by a team of research nurses while providing outpatient care on 2 days. The patient sample consisted of consecutive patients seen during the 2 days of observation. Patients were informed about the study in the waiting room prior to meeting with their physicians and were enrolled if they gave verbal informed consent. To avoid biasing their behavior, participating pa-

tients and physicians were informed only that this was a study of the content of family practice; no specific hypotheses were shared.

The research nurses collected data on the content and context of family practice using the following methods: direct observations of the patient visit, patient exit questionnaires, medical record review of all directly observed visits, billing data on Current Procedural Terminology (CPT) codes and International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnoses, and questionnaires completed by the physicians at the end of the study. Two months of training prior to the study and retraining every 2 weeks during the study ensured high interrater reliability.[16]

Measures

The geographic location of each practice site was determined by consensus between the two nurse observers visiting the practice. This manner of classification is grounded in local features rather than utilizing measures based on ZIP codes or formulas incorporating distances from a metropolitan center.[3,4,6,9,10] Practices were classified as rural if the predominant physical features of the landscape surrounding the community in which the practice was located were farmland, pastures, meadows, or forest and if the predominant buildings and structures in the area surrounding the community consisted of farmhouses, barns, and silos. Practices were classified as suburban if the predominant buildings surrounding the community in which the practice was located consisted of single-family dwellings with modest-to-generous-size lots, along with shopping areas consisting of malls or clusters of stores and businesses segregated from the housing units. Practices were classified as inner city if the predominant buildings surrounding the community in which the practice was located consisted of single-family dwellings, duplexes, and apartments, with small lots accompanying the houses, and where the shops and offices were typically close to or interspersed with the housing units.

Data on patient characteristics, including age, smoking status, whether the patient was new or established, number of years with the practice, number of visits to the practice within the past year, number of chronic illnesses, and number of medications, were assessed from the medical record. Gender was identified by the research nurse by direct observation. The patient's race (measured as white versus non-white) was identified via patient questionnaire for the 75% of patients who returned the questionnaire. For those patients not returning a questionnaire, race was identified by the research nurse by direct observation. Nurse assessment of race was found to be highly concordant with patient report for those returning a questionnaire ($\kappa = 0.90$). The patient's marital status and educational level attained were obtained from the patient questionnaire. The patient's type of medical insurance was determined from billing data and was verified by the patient questionnaire when possible.

Data on visit characteristics, including major reason for visit (measured as care for an acute illness, chronic illness, well care, or other), length of visit, whether a referral was made, and whether a drug was prescribed, were determined by direct observation. The number of problems addressed during the visit was assessed by medical record review. The complexity of the visit was estimated by the nurse observers by direct observation and was rated on a scale from 1 to 5 based on American Medical Association (AMA) criteria for assigning the level of the CPT code.[17]

Health status was measured on the patient exit questionnaire using a modified version[16] of the Medical Outcomes Study (MOS) six-item Health Survey.[18] Patient report of emotional distress was measured on the patient exit questionnaire by a

single item from the MOS six-item General Health Survey,[18] which asked to what extent the patient had been bothered by emotional problems in the 4 weeks prior to the visit. Patient responses that they had been bothered "extremely" or "quite a bit" were interpreted as indicating recent emotional distress. The physician's diagnosis of depression and anxiety was measured by the ICD-9 codes listed for the index visit and subsequently categorized into the relevant diagnosis cluster.[19,20] Median household incomes for the census tracts in which patients lived were obtained by matching the patients' addresses with 1990 US census tract data.

The patient outcomes that were compared across the practice settings included rates of preventive service delivery, patient satisfaction, and patient report of the attributes of primary care. The preventive services that were examined were those recommended by the US Preventive Services Task Force.[21] The rates of delivery of screening, counseling, and immunization services were assessed and summarized as rates of service delivered to eligible patients during the observed visit and rates at which patients were up to date on these recommended services. The methods used to create these summary scores have been previously described in detail.[22] Briefly, patient eligibility to receive the recommended preventive services based on patient age and sex was determined by medical record review. The rate of delivery of preventive services for which the patient was eligible was measured by direct observation during the index visit. A second measure of the rate at which patients were up to date on recommended preventive services was assessed with a combination of direct observation of services delivered during the index visit and medical record review of previous receipt of services.[23]

Patient satisfaction was measured on the patient exit questionnaire using the MOS nine-item Visit Rating Scale.[24] Items were measured on a five-point Likert-type scale, with a score of 1 indicating poor satisfaction and 5 indicating excellent satisfaction. A single item measured the patient's overall satisfaction with the visit. The patient's satisfaction with the doctor and the site was measured with four-item subscales ($\alpha = .90$ and .72, respectively).

The final outcome, patient report of attributes of the domains of primary care, was measured using the Components of Primary Care Instrument (CPCI),[25] to which patients responded as part of the patient exit questionnaire. The four scale scores resulting from the CPCI are the patient's preference for their regular physician ($\alpha = .74$), interpersonal communication ($\alpha = .68$), physician's accumulated knowledge of the patient ($\alpha = .75$), and coordination of care ($\alpha = .79$). Scale scores ranged from 1 to 5, with low scores indicating low endorsement of the items in the scale and high scores indicating high endorsement.

Analyses

Univariate statistics were used to determine differences in practice and physician, patient, and office visit characteristics among the three practice settings: inner city, rural, and suburban. Continuous independent variables were compared using analysis of variance techniques, and chi-square tests were used to compare categorical variables. Analysis of covariance was used to compare the preventive service delivery summary scores, satisfaction, and attributes of primary care among the three practice settings. Potential confounders were entered as covariates, and the analysis was adjusted for those patient and visit characteristics that were found to be significantly associated with practice setting ($P < .05$). Patient reported health status and educational level attained were excluded as covariates due to large amounts of missing data.

Post hoc analyses, specifically the Tukey honestly significant differences (HSD) for continuous variables and the chi-square test for categorical variables, were used to test the pairwise differences between groups for those variables that were significantly associated with practice location. Due to the number of comparisons being made, a Bonferroni correction was generated for each group of comparisons (shown in each table) by dividing $\alpha = .05$ by the number of comparisons made. Only those variables with a *P* value less than or equal to the Bonferroni correction were interpreted as being significantly associated with practice location.

For the patient-level analyses, the nested nature of the data (multiple patients seeing the same physician) may tend to inflate the significance level. Accordingly, only *P* values less than or equal to .005 were interpreted.

RESULTS

Table 1 shows characteristics of the practices compared by their geographic location. There were 19 practices classified as rural, 16 as inner city, and 49 as suburban. Inner-city practices had the highest number of physicians per site and rural practices the least. There were differences in the ancillary services provided based on geographic location. Inner-city practices were more likely to have on-site colposcopy and dietician services, while suburban practices were more likely to provide radiology services.

The demographics of the physicians are similar to those of family physicians nationally, except the sample physicians included a higher percentage of residency-trained and female physicians.[14,16,26] Physician characteristics by practice location are shown in Table 2. Rural physicians evaluated the most patients hourly and weekly, while inner-city physicians evaluated the fewest. These differences persisted after excluding physicians practicing in family practice residency training sites. Family physicians practicing in inner-city areas saw patients for half as many hours per week as physicians in rural areas, with suburban physicians being intermediate.

TABLE 1. Selected characteristics of family practice sites by practice location

Characteristic	Rural	Inner city	Suburban	*P**
Total number of sites	19	16	49	
Total number of patients	876	979	2,599	
Mean number of physicians at each site	2.3	9.3	4.9	.001†,‡
Ancillary services on site, %				
Radiology	13.6	0.0	34.2	<.001‡
Colposcopy	13.6	53.5	20.5	<.001†,‡
Dietician	0.0	27.9	11.0	.005†,‡
Phlebotomy	81.8	72.1	91.8	.02
Laboratory	18.2	25.6	30.1	.53
Flexible sigmoidoscopy	50.0	51.2	64.4	.27
Procedure room	81.8	58.1	76.7	.05
Consultants	18.2	18.6	11.0	.46

*Bonferroni correction: $P \leq .005$ interpreted as significant.
†Rural practices differ from inner-city practices
‡Inner-city practices differ from suburban practices.

TABLE 2. Characteristics of physicians by practice location

Characteristic	Rural (n = 22)	Inner city (n = 43)	Suburban (n = 73)	*P**
Age, years	44.9	42.6	42.9	.50
Gender, % female	13.6	37.2	24.7	.11
Residency trained in family practice, % yes	90.5	87.5	89.6	.92
Number of years in current practice	11.7	9.7	10.5	.64
Number of hours/week of patient care	50.8	25.1	38.6	<.001†
Number of patients seen per hour‡	4.0	3.0	3.4	.006§
Number of patients seen per week	131.2	75.1	114.3	.006§,‖
Employee vs. owner of practice (% owners)	100.0	12.5	56.9	<.001†

*Bonferroni correction: $P \leq .007$ interpreted as significant.
†All three groups differ.
‡When physicians practicing in residency training sites are excluded, there is no significant difference.
§Rural practices differ from inner-city practices.
‖Inner-city practices differ from suburban practices.

Rural physicians were far more likely to own their practice, while inner-city physicians were more likely to be employees.

A total of 4,454 patient visits were observed among 138 family physicians at 84 different family practice sites. Of the 4,994 patients presenting for care on the observation days, 89% participated in the study. Nonparticipants were similar to participants in sex, race, and number of years as a patient, but tended to be slightly older.[16] The data on patient characteristics summarized in Table 3 indicate that rural patients were slightly older, less well educated, and half as likely to be new patients. Suburban patients were slightly younger and better educated, reported a marginally better health status, had fewer chronic medical problems, took fewer medications, made fewer office visits in the preceding year, had been with the same practice a shorter time, and lived in more affluent neighborhoods. Inner-city patients were more often female, far more often non-white, less often married; had more chronic medical problems; made more office visits in the preceding year; and lived in poorer neighborhoods. Suburban patients were much more likely to have managed-care insurance, less often had Medicare, and were less likely to have no insurance. Substantially more inner-city patients had Medicaid insurance. Rural patients more often paid on a fee-for-service basis.

Among the characteristics of the office visits shown in Table 4, rural patients had slightly fewer visits for well care. Suburban patients had more acute illness visits and fewer chronic illness visits, while inner-city patients had fewer acute illness visits and more visits for chronic illnesses. Inner-city patients had distinctly more problems addressed during considerably longer office visits and received fewer drug prescriptions. Inner-city patients reported more emotional distress, were substantially more likely to have their emotional distress diagnosed, and were more likely to be referred to a nonphysician within the office, such as a counselor or a dietitian. Patient visits to inner-city physicians were more complex as judged by the research nurses using AMA criteria. Rural physicians billed lower CPT codes.

Table 5 summarizes preventive service delivery, patient satisfaction measures, and patient-reported primary care attributes based on practice location. Inner-city patients were more likely to have preventive counseling services up to date (such as

TABLE 3. Patient characteristics by practice location

Characteristic	Rural (n = 876)	Inner city (n = 979)	Suburban (n = 2,599)	*P**
Age, years	44.2	42.1	40.2	<.001†
Gender, % female	59.1	68.2	59.9	<.001‡,§
Race, % non-white	3.4	31.9	9.7	<.001‖
Health status (1 = poor, 5 = excellent)	3.7	3.7	3.8	<.001†,§
Insurance, %				
Medicare	28.7	24.9	19.8	<.001‖
Medicaid	6.1	16.1	3.4	
Fee for service	26.2	14.6	19.8	
Managed care	23.9	25.3	44.2	
None	8.7	9.6	6.0	
Other	6.4	9.6	6.8	
New versus established patient, % new	4.9	8.2	9.9	<.001‡,§
Educational level attained,¶ % > high school	39.5	45.0	55.4	<.001†,§
Median household income in patient's census tract of residence	$30,956	23,929	35,920	<.001‖
Marital status,¶ % married	66.1	48.3	66.2	<.001‡,§
Smoking status,# % current smoker	17.9	21.1	17.2	.13
Number of years with physician	6.0	6.3	4.9	<.001†,§
Number of visits in last year	4.4	4.7	4.1	<.001†,§
Number of chronic problems listed on chart by physician	2.5	3.2	1.9	<.001†,§
Number of chronic medications	1.9	2.1	1.4	<.001‖

*With the Bonferroni correction: $P \leq .003$ interpreted as statistically significant.
†Rural practices differ from suburban practices.
‡Rural practices differ from inner-city practices.
§Inner-city practices differ from suburban practices.
‖All three groups differ.
¶Includes only patients 18 years and older.
#Includes only patients 13 years and older.

contraception counseling, accident prevention counseling, counseling regarding use of child car seats, poison prevention counseling, alcohol use counseling, and drug use counseling).

There were no significant differences in satisfaction with the physician or the office, but rural patients were slightly more likely to be satisfied with the practice site, and patients in rural practices reported that their physician had a slightly greater accumulated knowledge of them. There were no other differences in the patients' ratings of the Components of Primary Care.

DISCUSSION

From a research design standpoint, the major limitation of our study is the nonstandard methodology used to determine geographic location. Rather than using a

proxy measure of inner-city, suburban, and rural locations, such as ZIP codes or a formula incorporating a distance from a metropolitan center,[3,4,6,9,10] we used direct observation as a method of categorizing the location of each practice. The concurrent assessment by two research nurses per site enhanced the reliability of the geographic assignment, but possible variability in the application of the definitions of inner city/suburban/rural is a potential limitation of the study. While using direct observation to determine geographic location is unconventional compared with previous studies, we believe that it is by no means less valid. Proxy measures are inherently indiscriminate since they aggregate based on arbitrary boundaries, whereas the direct observation classification is based on local features. Whatever methodology one uses to determine geographic location, misclassification of some practice locations is possible. In our opinion, classification methods based on direct observation are more likely to be accurate than indirect or proxy methods.

Another limitation of the study is that the presence of the nurse observers might have elicited a Hawthorne effect. While procedures were instituted to minimize this effect, including blinding physicians as to the study hypotheses and positioning the nurse observers in the least intrusive corner of the examination room,[16] some degree of Hawthorne effect would be an expected and inevitable limitation of a direct observational study.

TABLE 4. Office visit characteristics by practice location

Characteristic	Rural (n = 876)	Inner city (n = 979)	Suburban (n = 2,599)	*P**
Reason for visit, %				
Acute	58.0	49.8	60.8	<.001†,‡
Chronic	24.4	28.7	21.0	
Well	11.0	12.6	12.2	
Other	6.6	8.9	6.0	
Number of problems addressed	1.8	2.2	1.7	<.001§
Length of visit, minutes	9.2	12.1	9.5	<.001†,‡
Billed CPT code‖	2.85	2.93	2.95	.004#
Nurse estimate of complexity of visit**	2.9	3.1	2.9	<.001†,‡
Medication prescribed, % yes	65.6	58.0	62.8	.003†,‡
Referral made, % yes	8.2	12.1	10.2	.03
Referral to another physician	5.9	7.8	8.0	.11
Referral to a nonphysician in the office	0.5	3.2	1.4	<.001†,‡
Referral to a nonphysician outside office	2.2	1.9	2.7	.35
Patient report of emotional distress				
No emotional distress reported	60.3	57.5	69.8	<.001‡,#
Emotional distress not diagnosed	33.5	31.7	25.3	
Emotional distress diagnosed	6.2	10.8	4.9	

CPT, current procedural terminology.
*Bonferroni correction: $P \leq .004$ interpreted as significant.
†Rural practices differ from inner-city practices.
‡Inner-city practices differ from suburban practices.
§All three groups differ.
#Rural practices differ from suburban practices.
**Based on nurse estimate of CPT code. 99211 or 99201 = 1, 99215 or 99205 = 5.

TABLE 5. Association of patient and visit outcomes with practice location*

	Rural (n = 876)	Inner city (n = 979)	Suburban (n = 2,599)	*P*†
Preventive service delivery				
Percentage preventive services delivered‡				
Screening services delivered	15.3	12.8	14.0	.09
Counseling services delivered	3.8	3.8	3.5	.39
Immunization services delivered	4.4	1.9	3.5	.007
Percentage preventive services up to date‖				
Screening services up to date	53.3	55.8	54.9	.08
Counseling services up to date	8.2	11.0	9.1	<.001§
Immunization services up to date	22.7	23.0	22.6	.96
Satisfaction (1 = poor, 5 = excellent)				
Satisfaction with doctor	4.4	4.4	4.4	.83
Satisfaction with site	4.2	4.0	4.0	.002§,¶
Overall satisfaction for the visit	4.4	4.5	4.4	.09
Components of Primary Care Instrument summary measures**				
Preference for regular physician	4.5	4.5	4.5	.69
Accumulated knowledge	3.7	3.6	3.5	<.001††
Interpersonal communication	4.3	4.4	4.3	.15
Coordination of care	3.9	4.0	3.9	.09

*Analyses adjusted for patient age, gender, race, type of insurance, new or established patient, reason for visit, number of problems addressed, length of visit, CPT code, number of chronic problems, number of medications, referral made, medications prescribed, number of visits in previous year, number of years as patient of physician, and median household income in patient's census tract of residence.

†Bonferroni correction: $P \leq .003$ interpreted as significant.

‡Indicates the percentage of preventive services the patient was eligible to receive that was delivered at the observed site.

‖Indicates the percentage of preventive services for which the patient was up to date.

§Rural practices differ from inner-city practices.

¶Rural practices differ from suburban practices.

**Scores range from 1 to 5. A score of 5 indicates high endorsement of importance of items in the scale.

††All three groups differ.

Another potential limitation is the generalizability of the findings. Since the physicians were all family doctors, the results may not be representative of other types of physicians. Moreover, since the study enrolled only patients and family physicians from northeast Ohio, the results may not be applicable to patients and physicians in other parts of the United States. Nonetheless, patient and physician characteristics in this study are similar to those of patients and physicians nationally, except our sample represents recent trends toward greater numbers of residency-trained and female physicians.[14,16,26] Although caution should be used in extrapolating these findings to different locales, the results of this study are likely transportable to patients and more recently trained physicians in other family practices in similar geographic locations.

In addition, there may be unmeasured variables that the study unknowingly failed to take into account. For example, since the observation interval was short, it is possible that the behavior of both patients and physicians was influenced by a particular season or time of year.

With these limitations in mind, our data identify distinct differences in the patient and office visit characteristics of the family physician practices in inner-city, suburban, and rural areas of northeast Ohio. Some of these differences, such as patients' self-reported health status (Table 3), are miniscule. While such exceedingly small differences are statistically significant, they are not clinically important. Other measurements, such as the number of physician visits in the last year (Table 3) or nurse estimates of the complexity of the visit (Table 4), vary modestly between practice locations in absolute terms, but approximately 6%–7% in terms of percentage. Differences of this magnitude not only are statistically significant, but also are important from clinical and policy standpoints.

On a related note, the data are naturally clustered (several patients seeing a single physician within a rural, urban, or suburban site). Ideally, this calls for an analysis strategy that takes into account the clustering, such as hierarchical linear modeling (HLM). However, it is unlikely that a model solution could be obtained with the large number of control variables in the model due to limitations in the currently available software. The danger inherent in ignoring the clustered nature of the data is that the standard errors are underestimated; therefore, the *P* values are inflated. This increases the probability of a type 1 error. Accordingly, to minimize the possibility of a type 1 error, for data at the patient level, we chose only to interpret findings with a highly significant *P* value (<.005).

Consistent with previous research, our study found that rural adults are older and less well educated than nonrural adults.[2,7] Earlier studies showed that patients in rural areas receive fewer preventive services than patients in nonrural locations,[2,6,8,27,28] but our results do not support this prior finding. Whereas previous research documented that rural adults are poorer, have more chronic diseases, and are less likely to have health insurance compared with nonrural adults,[3,4,6,9,10] our results indicate these generalizations pertain only when rural patients are compared to suburban patients. Furthermore, in northeast Ohio, compared to rural adults, inner-city patients are poorer, have more chronic diseases, and are less likely to have health insurance.

Several prior studies of patients and physicians are muddied because they were unable to distinguish inner-city from suburban populations.[3,4,6,8,9] Since the results of our study clearly show differences between inner-city and suburban patient populations, previous publications that fail to incorporate this distinction lack an important detail that may result in inaccurate conclusions.

While previous research identifies differences between rural and nonrural practices, with rural patients and physicians appearing disadvantaged compared with their nonrural counterparts, our study clearly identifies disparities between inner-city and non-inner-city patients and family physicians. Our results paint a picture of the inner-city family physician addressing more medical and emotional problems per patient encounter during longer and more complex office visits. Patients in inner-city settings tend to have more chronic medical problems, and they return to see the doctor more frequently than patients of suburban or rural family physicians. Inner-city family physicians in this sample diagnosed more emotional problems and wrote fewer prescriptions, indicating a greater psychosocial focus on the part of these physicians. Despite—or perhaps in response to—seeing a more high-risk patient population, inner-city family physicians in this cohort provided more preventive health habit counseling services while still delivering preventive screening and immunization services comparable to their rural and suburban counterparts.

The available data do not allow a comparison of the reimbursement among rural, suburban, and inner-city physicians. The inner-city physicians in this sample code their billing for office visits at similar levels as suburban physicians, despite the observation that they see more complex patients during longer and more complicated visits. Given evidence indicating generally accurate billing by family physicians in this cohort,[29,30] this raises suspicion of undercoding by inner-city physicians. Inner-city physicians in this sample are likely to be underreimbursed compared with their suburban colleagues due to this undercoding.

Even if inner-city physicians coded their office visits more accurately, there is another reason to believe that inner-city physicians are not equitably reimbursed in relation to their non-inner-city colleagues. The medical insurance payer mix differs by geographic location. Of particular note, Medicaid is less lucrative than other types of medical insurance. Since there is a 10% difference between the frequency of Medicaid insurance in inner-city areas compared with rural areas, and an even greater disparity compared with suburban areas, it is likely that, in relation to non-inner-city physicians, the total reimbursement of inner-city physicians is lowered by the high proportion of Medicaid patients.

Compared to rural and suburban physicians, the inner-city physicians in this sample devote less time per week to patient care. The shorter average work week of inner-city physicians may represent an effort to prevent burnout consequent to seeing a challenging patient population.

These observations may be relevant to efforts to improve the geographic distribution of physicians. If adequate physician representation in medically underserved rural and inner-city areas is a goal of public policy, then recognition of the unique characteristics of both inner-city practice and rural practice is necessary. The challenging patient population, along with the complexity of the office visits in inner-city settings, may have important implications for individual physicians in terms of burnout and equitable reimbursement. This in turn has implications for the societal issue of physician availability in medically underserved areas.

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